

REMARKSI. Status of the Claims

Claims 1-20 are pending. Applicants have cancelled claims 2-7, 10, and 14-18 and amended claims 1, 8, 9, 19, and 20 in this response. Upon entry of the amendment, claims 1, 8, 9, 11-13, 19, and 20 will remain for consideration.

II. Supplemental Information Disclosure Statement

Applicants wish to bring to the Examiner's attention a number of recently found references. Several of the references were cited in the search report for the corresponding PCT international application. Because the search report was mailed to Applicants more than three months ago, the statement is filed under 37 C.F.R. § 1.197(c)(2) and is accompanied by the fee set forth in § 1.17(p).

The cited references include WO 03/014014 (Paparrato et al., equivalent to U.S. Pat. Appl. Pub. No. 2004/184983). Paparrato teaches polymer-encapsulated palladium catalysts and their use for making hydrogen peroxide. In particular, Example 5 of the reference teaches polystyrene-encapsulation of a Pt-Pd on carbon to give a catalyst having about 3 wt.% polystyrene. However, Paparrato does not teach the use of a polystyrene-encapsulated palladium catalyst in which the palladium is supported on a *titanium zeolite* prior to polystyrene encapsulation, as Applicants' amended claims require.

EP 0498166 (equivalent to U.S. Pat. No. 5,180,573) was also cited in the search report. This reference shows polymer-encapsulated palladium catalysts in Example 7 and Comparative Example 8. The reference does not disclose a polystyrene-encapsulated palladium catalyst in which the palladium is supported on a titanium zeolite prior to polystyrene encapsulation.

The search report also cites U.S. Pat. Appl. Pub. No. 2003/018143 as relevant art. However, this reference does not disclose a hydrogen peroxide-producing process as defined by Applicants' claims. Moreover, the reference does not disclose polystyrene-encapsulated palladium catalysts in which the palladium is supported on a titanium zeolite prior to polystyrene encapsulation.

### III. Claim Amendments

Applicants amended their claims to better distinguish their invention from disclosures such as WO 03/014014 and U.S. Pat. No. 5,180,573. The amended claims all require the use of a polystyrene-encapsulated palladium catalyst. Moreover, the palladium is supported on a titanium zeolite prior to polystyrene encapsulation. None of the cited art teaches or suggests the use of such a catalyst in a process for making hydrogen peroxide from hydrogen and oxygen.

### IV. Response to the Rejection under Section 103

Applicants traverse the rejection of claims 1-20 under 35 U.S.C. § 103 as unpatentable over Zhou et al. (U.S. Pat. Appl. Pub. No. 2004/0018143) in view of Kobayashi et al. (Chem. Commun. (2003) 449), and they respectfully ask the Examiner to reconsider and withdraw the rejection in view of the following remarks.

Zhou teaches a process for making hydrogen peroxide using supported noble metal catalyst particles with a "controlled surface coordination number." In Example 11, Zhou shows Pt/Pd deposited on a carbon black support. Nowhere does Zhou teach or suggest to make a polystyrene-encapsulated palladium catalyst for making hydrogen peroxide. Additionally, Zhou also fails to teach the idea of supporting the palladium on a titanium zeolite prior to polystyrene encapsulation.

Kobayashi teaches benefits of microencapsulating transition metals, including palladium, and using microencapsulated catalysts for a wide variety of organic transformations. In the paragraph bridging pages 455 and 456, Kobayashi teaches that microencapsulated palladium catalysts can be used for "allylic substitution, oligomerization, decarboxylation, hydrogenation, isomerization, telomerization, Suzuki coupling, and the Mizoroki-Heck reaction." Kobayashi does not teach or suggest that polystyrene-encapsulated palladium catalysts would be valuable for making hydrogen peroxide from hydrogen and oxygen, as Applicants' claims require. Kobayashi is also silent regarding any

benefit of making a polystyrene-encapsulated palladium catalyst in which the palladium is supported on a titanium zeolite prior to polystyrene encapsulation.

The Examiner suggests that a skilled person would have found it obvious to use a microencapsulated catalyst in Zhou's process for making hydrogen peroxide because Zhou discloses an "encapsulated" catalyst (claim 10) and Kobayashi suggests benefits of using encapsulated catalysts (e.g., ease of isolation and reuse of the catalyst).

A proper rejection for obviousness under 35 U.S.C. § 103 requires motivation to combine the reference teachings and a reasonable expectation of success in making the claimed invention from the combined teachings. Both are lacking here.

First, a skilled person has no motivation to combine the reference teachings because there is no nexus between the references. Like Applicants, Zhou describes a hydrogen peroxide-producing process. However, Zhou says nothing about encapsulating the noble metal catalyst within *polystyrene*, as the amended claims require. Kobayashi explains benefits of polymer encapsulation but is completely silent about using such catalysts in a process for making hydrogen peroxide. Thus, there is nothing besides Applicants' own disclosure to connect these references, and reliance thereon would constitute impermissible hindsight.

The Examiner points to Zhou's claim 10, which lists, as a possible support for the noble metal, "zeolite encapsulated vanadium picolinate peroxy complexes." As a skilled person will appreciate, even the use of such a support would not provide a "polymer-encapsulated" noble metal as contemplated by Applicants (or Kobayashi). Zhou uses supports in the traditional sense; the metal resides on the surface of the support, not within a polymer film. Moreover, because the claims now require a polystyrene-encapsulated palladium catalyst in which the palladium is supported on a titanium zeolite prior to polystyrene encapsulation, the claims are patentably distinct.

Second, even if it were proper to combine Zhou and Kobayashi, the combined teachings fail to provide a skilled person with a reasonable expectation

of success in making the claimed invention. Applicants' claims are limited to a hydrogen peroxide process that uses a polystyrene-encapsulated palladium catalyst, one in which the palladium is supported on a titanium zeolite prior to polystyrene encapsulation. Applicants have identified particular advantages of such a catalyst, including enhanced concentrations of hydrogen peroxide generated versus the amount obtained with polystyrene-encapsulated palladium that was *not* supported on a titanium zeolite before polymer encapsulation (see Table 1, Examples 3-6 vs. Examples 1-2). These performance advantages are not apparent from anything in Kobayashi, Zhou, or their combined teachings. The advantages became apparent only after Applicants performed their experiments.

In sum, Applicants' claims as amended meet the patentability requirements of Section 103, so the Examiner should reconsider and withdraw the rejection.

#### V. Conclusion

In view of the above remarks and amendments, Applicants respectfully ask the Examiner to pass the case to issue. Applicants invite the Examiner to telephone their attorney at (610) 359-2276 if he believes that a discussion of the application might be helpful.

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail, with sufficient postage, in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on December 20, 2005.

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